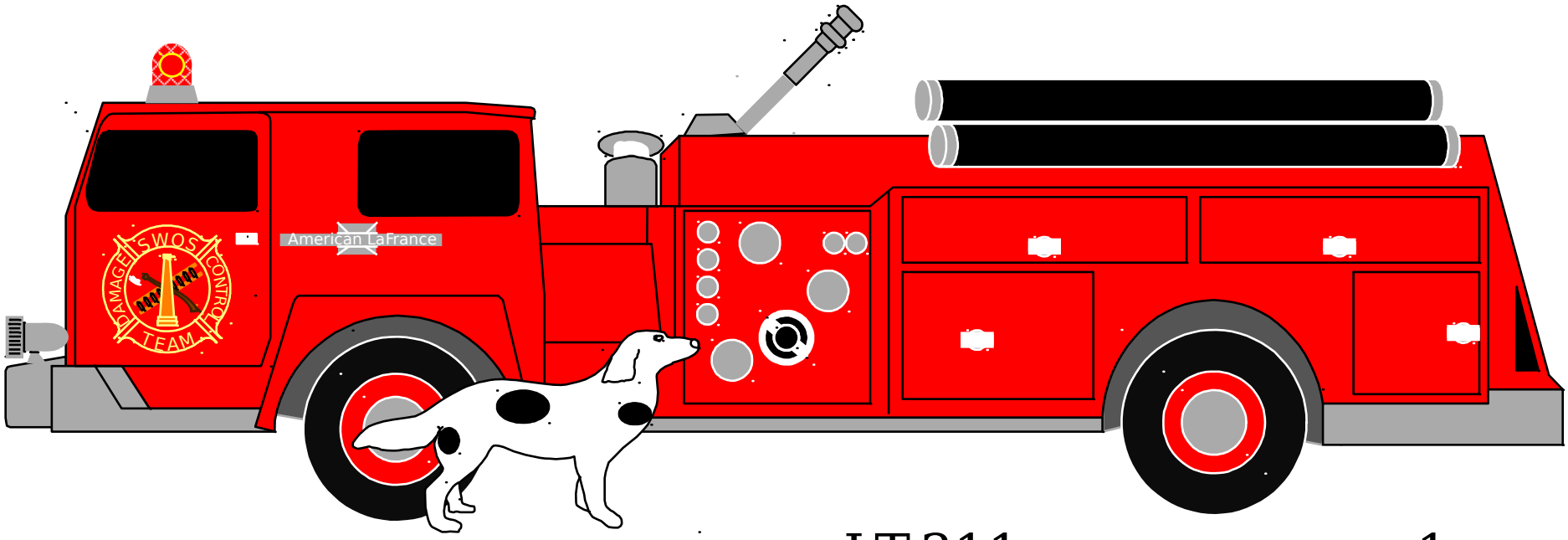
Firemain



ENABLING OBJECTIVES

- DESCRIBE the purpose, function, component parts, operating characteristics and maintenance requirements of the ship's firemain system
- DESCRIBE bi-metallic corrosion, its effect on seawater systems, and how to inspect for its presence

ENABLING OBJECTIVES

- EXPLAIN how to isolate and bypass ruptures of the firemain system using the firemain damage control diagram

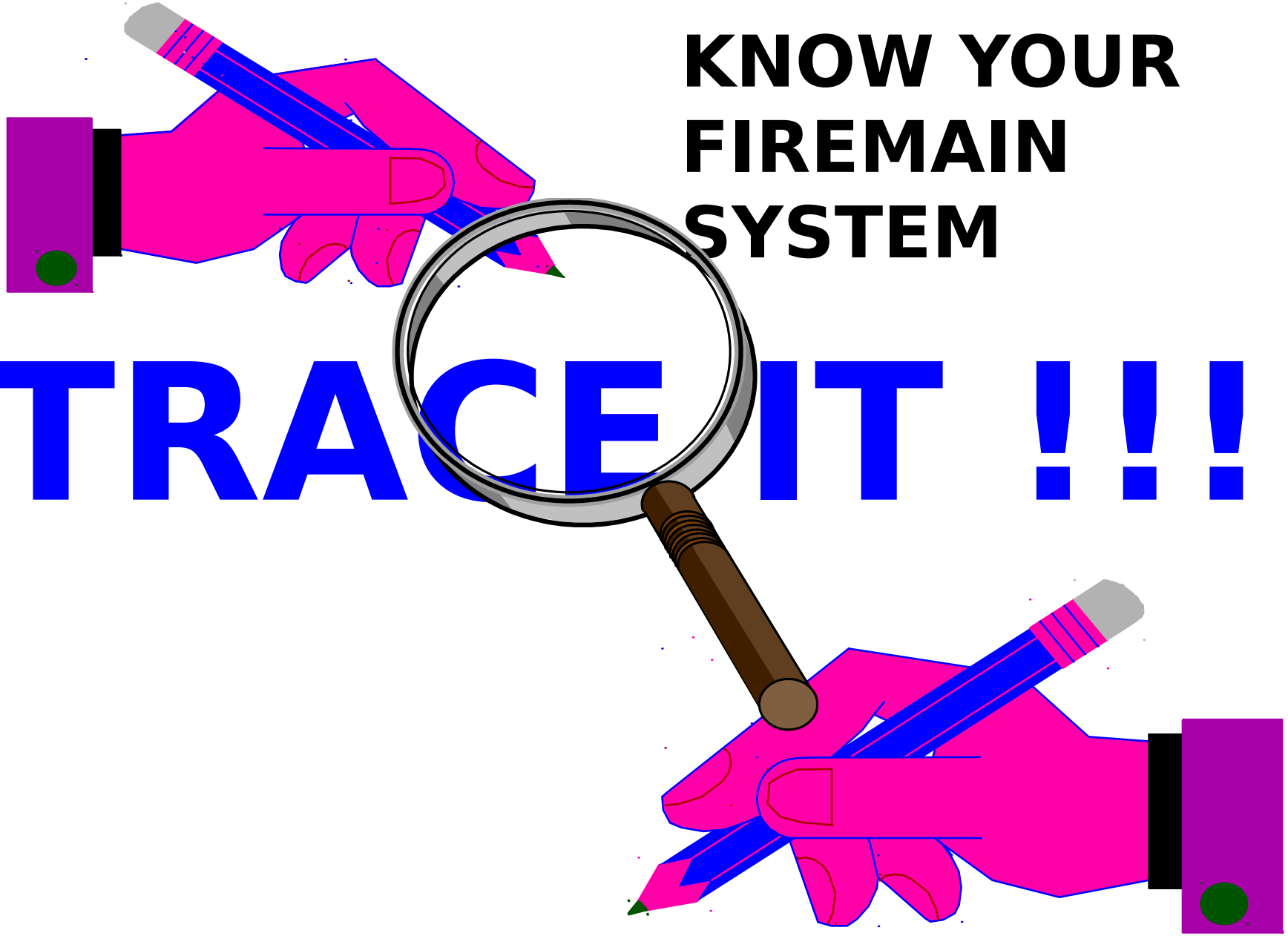
WHAT IS THE ***PRIMARY*** FUNCTION OF THE FIREMAIN SYSTEM?

⇨TO SUPPLY SEAWATER TO FIGHT FIRES

FIREMAIN

- ***"NO INFORMATION IS OF GREATER IMPORTANCE TO THE DAMAGE CONTROL ORGANIZATION THAN A COMPLETE KNOWLEDGE OF THE SHIP'S FIREMAIN SYSTEM"***
  - **NSTM 079 VOL 2**

KNOW YOUR FIREMAIN SYSTEM



TRACE IT !!!

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Firemain

- Firefighter should have a working knowledge of
  - Firemain piping
  - Firemain valves
  - Measures to be taken after battle damage to assure water service for firefighting

Firemain Systems

- Design Features
- Types
- Components
- Operation
- Maintenance

Design Features

Reliability:

Resistant to Saltwater Corrosion

Redundancy:

Multiple fire pumps

Optimum Sectionalization:

Independent stations practical during battle

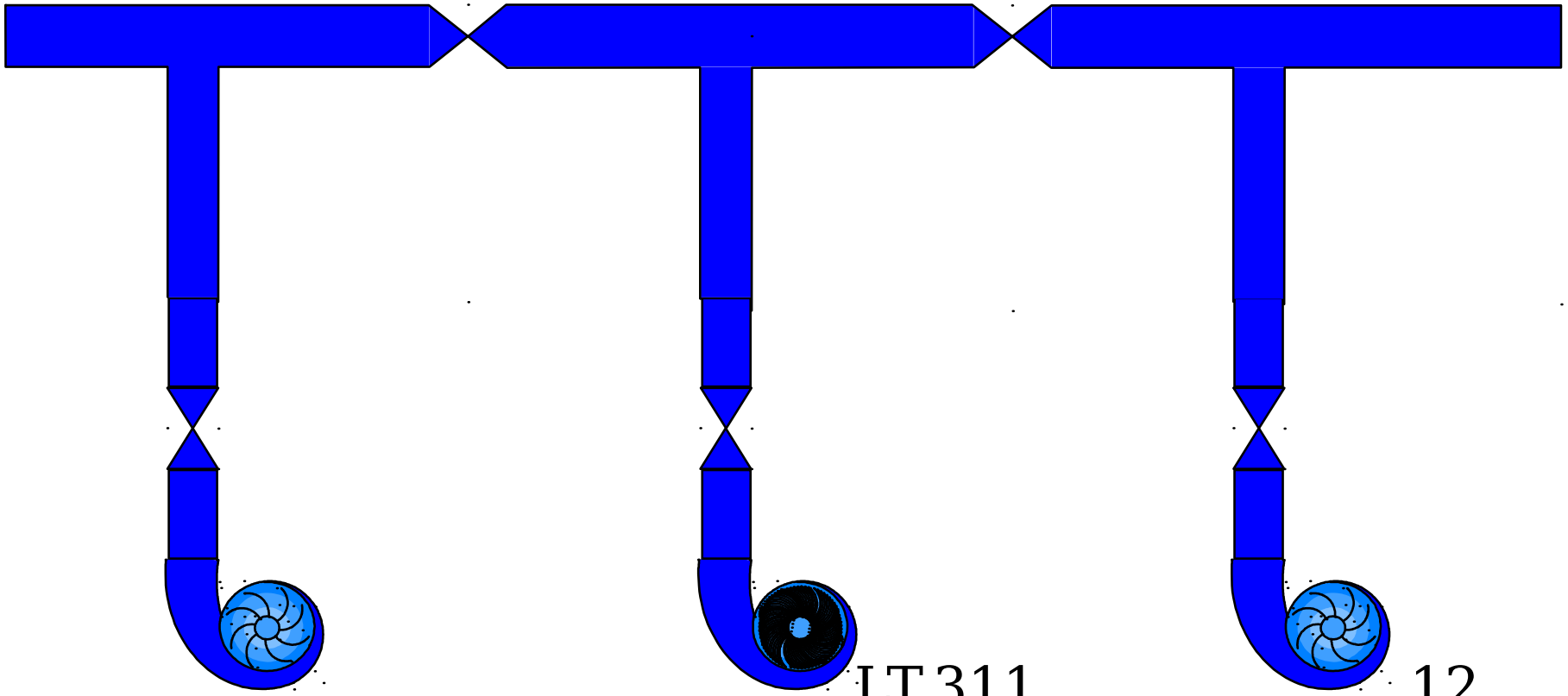
System Types

- **Single Main**
- **Horizontal Loop**
- **Vertical Loop**
- **Composite**

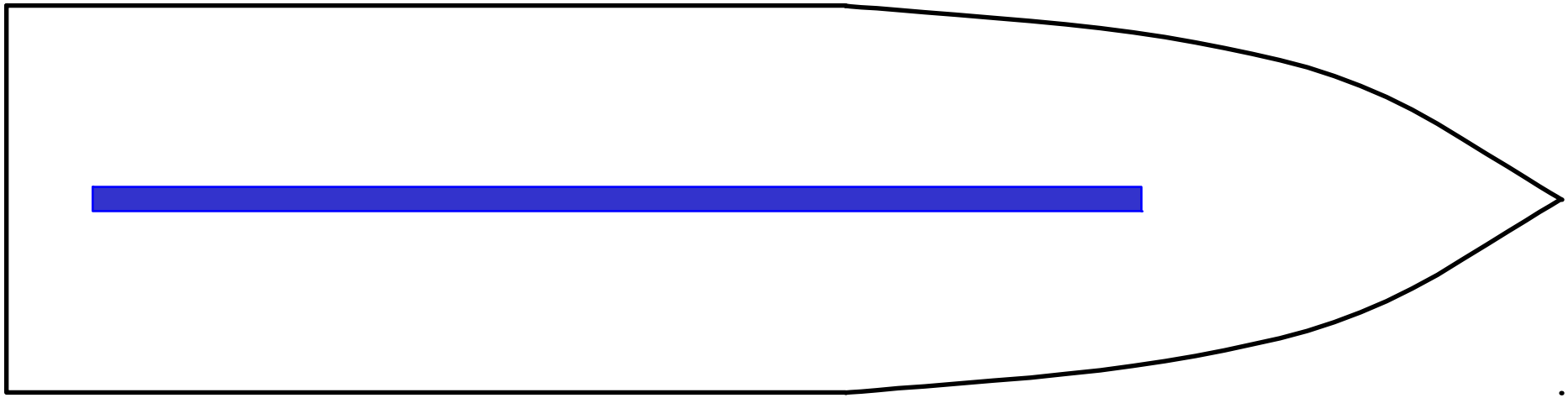
Single Main

- Extends longitudinally near the centerline of ship
- Pumps discharge into risers
- Risers direct water into main
- Main supplies fireplugs & other services
- Usually found on FF’s and DDG’s

Single Main



Single Main



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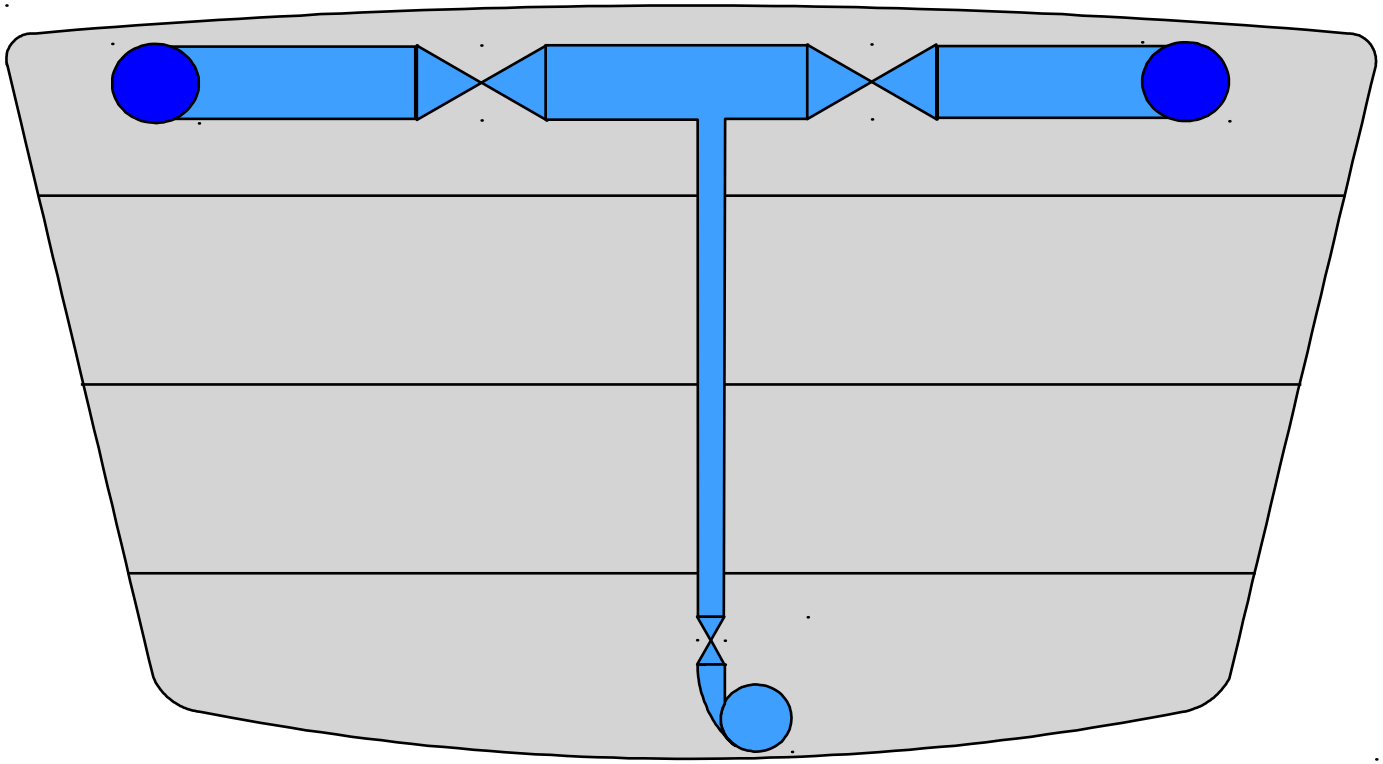
HORIZONTAL LOOP

- 2 Single Mains on DC Deck
- Separated athwartship
  - Minimizes damage
  - Cross-connected to form series of horizontal loops
- Risers connected into Cross Connects
- Allows water into either or both loops
- Service Risers & Branches

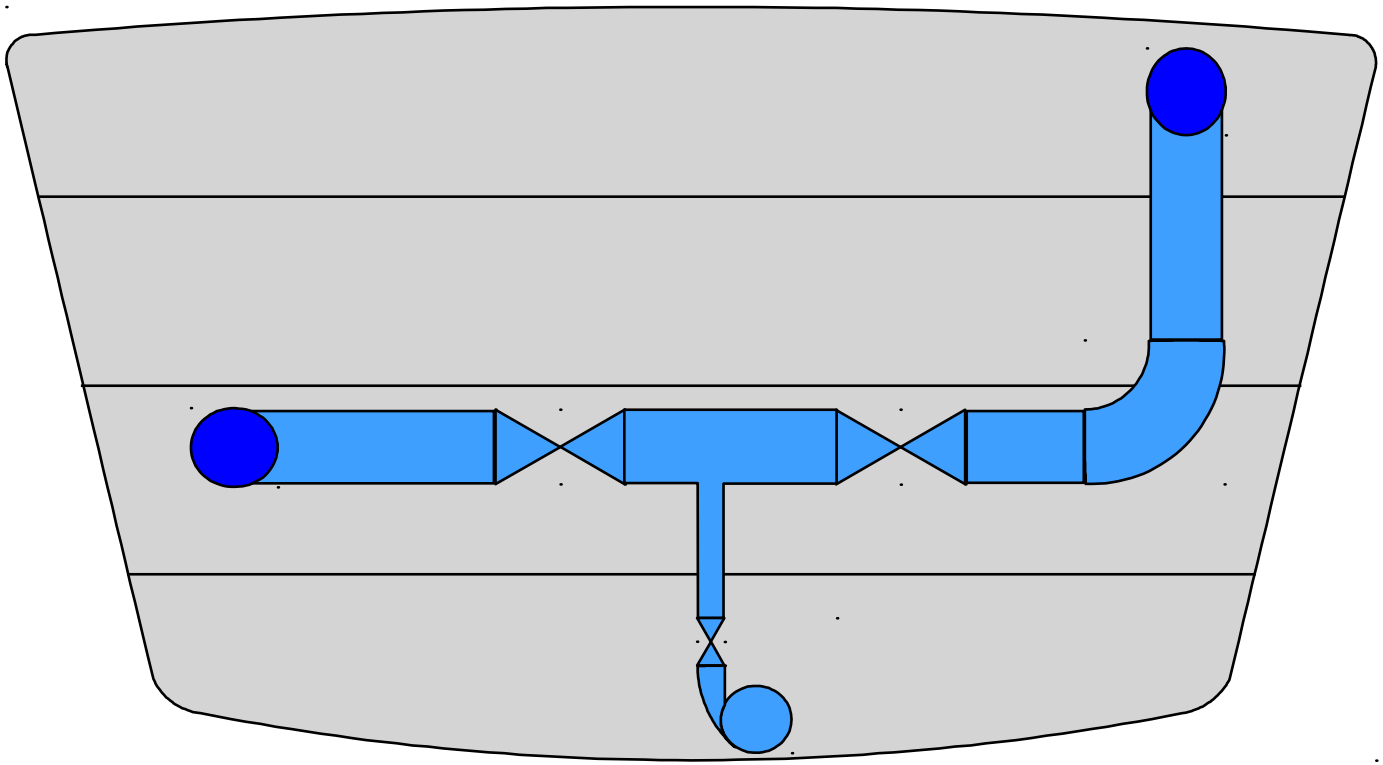
HORIZONTAL LOOP

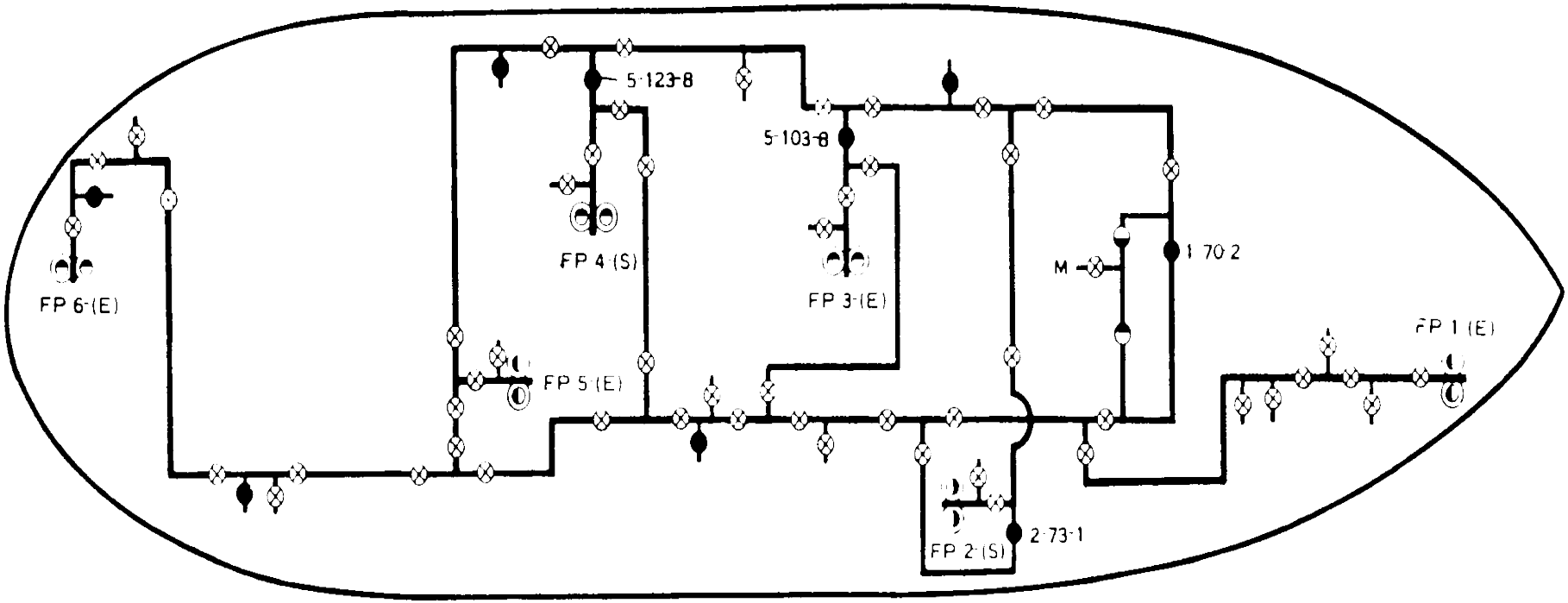


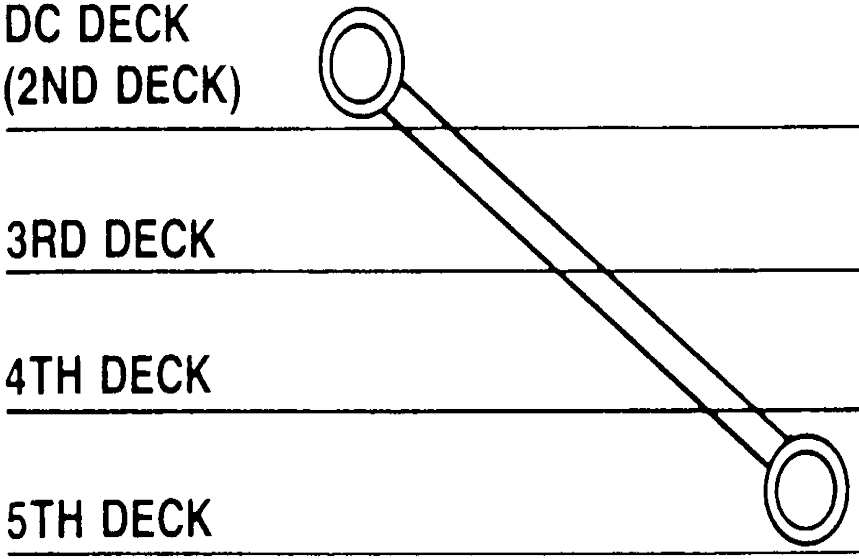
VERTICAL LOOP

- 2 Single Mains
- Installed in oblique plane
- Separated vertically & athwartship
- Upper Main installed on DC deck
- Lower Main is low in ship
- Mains are cross-connected to form series of loops
- Risers discharge port/stbd into either main
- Service Risers led from Main

VERTICAL LOOP





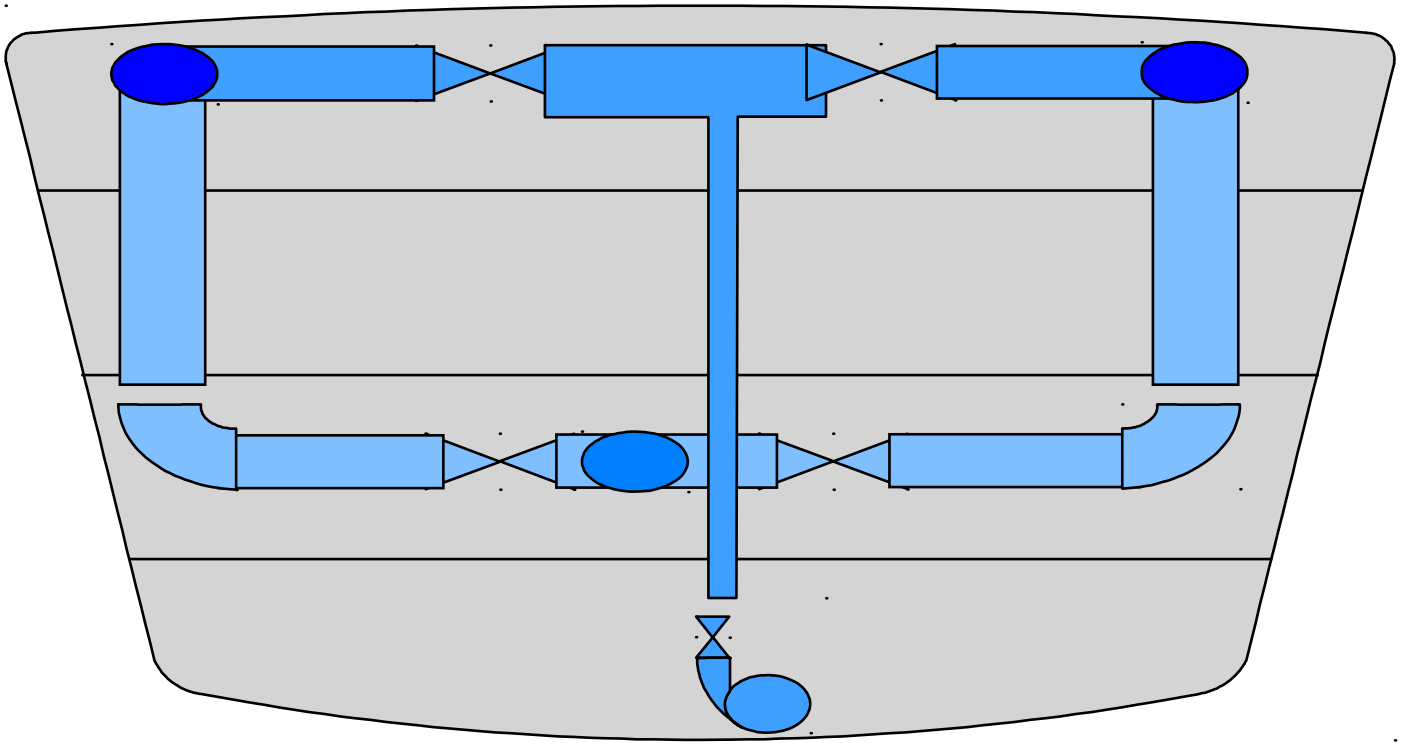


VERTICAL LOOP
(END VIEW)

COMPOSITE

- 2 or 3 service mains on DC deck
- Separated athwarthship
- By-pass main installed at lower level near C/L
- Cross-connects installed alternately between service mains & by-pass main
- Risers discharge into cross-connects
- Service risers led from service main

COMPOSITE

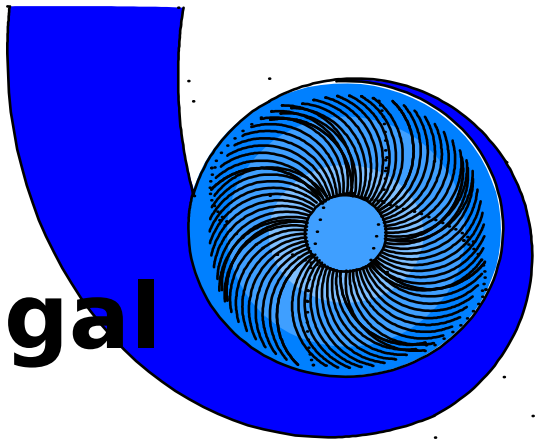


SERVICES PROVIDED (PARASITIC SYSTEMS)

1. MAGAZINE SPRINKLING
- CMWD
- DECON SHOWERS
- FLUSHING
- BALLASTING

6. EMERGENCY ELECTRONIC COOLING WATER
- EDUCTOR OPERATION
- MISSILE BOOSTER SUPPRESSION SYSTEM

Fire Pumps

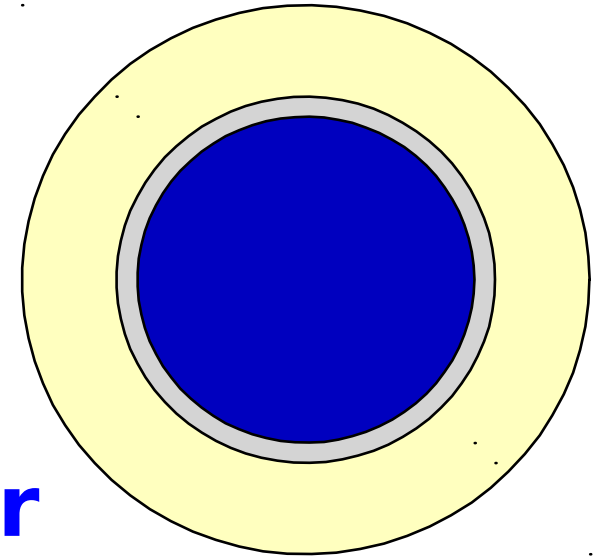


Single Stage Centrifugal

Electric Motor

Capacity of 1000 GPM at 150 psig

Piping



4" to 12" diameter

Depending on capacity requirements

Cu-Ni construction

Resistant to seawater corrosion

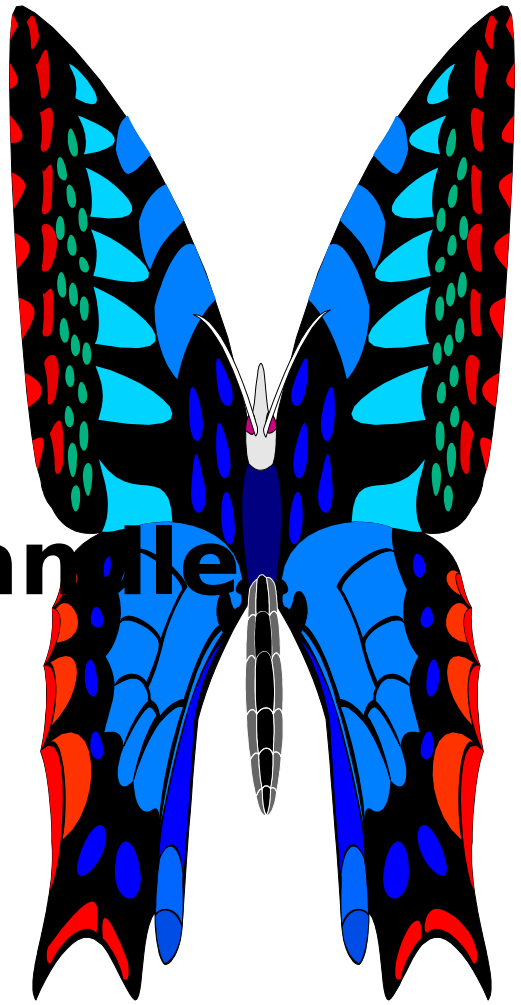
VALVES

Isolation

Gate (handwheel)
or Globe

Sectionalization

Butterfly - 1 motion handle



Pressure Reducing

Fireplugs

Station Isolation Valve

Marine strainer

Removed upon receipt of vari-nozzles

Wye-gate

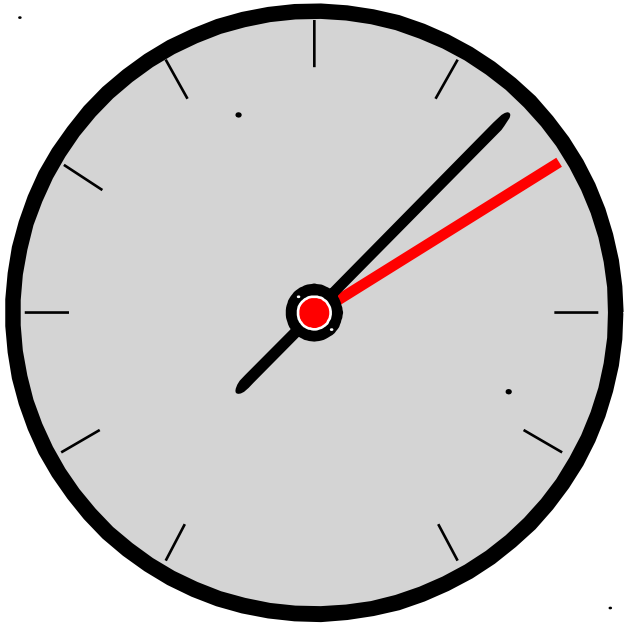
When required

Fire hose and nozzles

Size, Capacity, and Quantity dependent on requirements

Spanner Wrenches (2)

Gauges



Local

Fire Stations, Magazine Sprinkling, Flushing Stations

Remote

D C Central, Repair Lockers, Main Control

MARINE GROWTH

- Common cause of firemain malfunction
- Builds up in pipes, decreasing internal cross-section area
- Results in decreased supply of water
- Accumulates on valve seats, discs & stems
  - Prevents valve from seating
- Tropical waters

Flush system every 3 months. Operate pumps at one end of the ship & open weather deck fire plugs on other end.

Flush with freshwater if possible

MARINE GROWTH

Firemain System

Bimetallic Corrosion

- Dissimilar metals
- Pipe hangers/flanges - (Rubber space
- Ferrous fasteners - flanges
- Use a magnet
- All seawater systems

RUPTURED FIREMAIN

- **LOSS OF FIREMAIN PRESSURE**
- **FLOODED COMPARTMENTS**

⇨Must isolate damaged portions

- Restore pressure to intact system
- May be able to re-align segregation valves

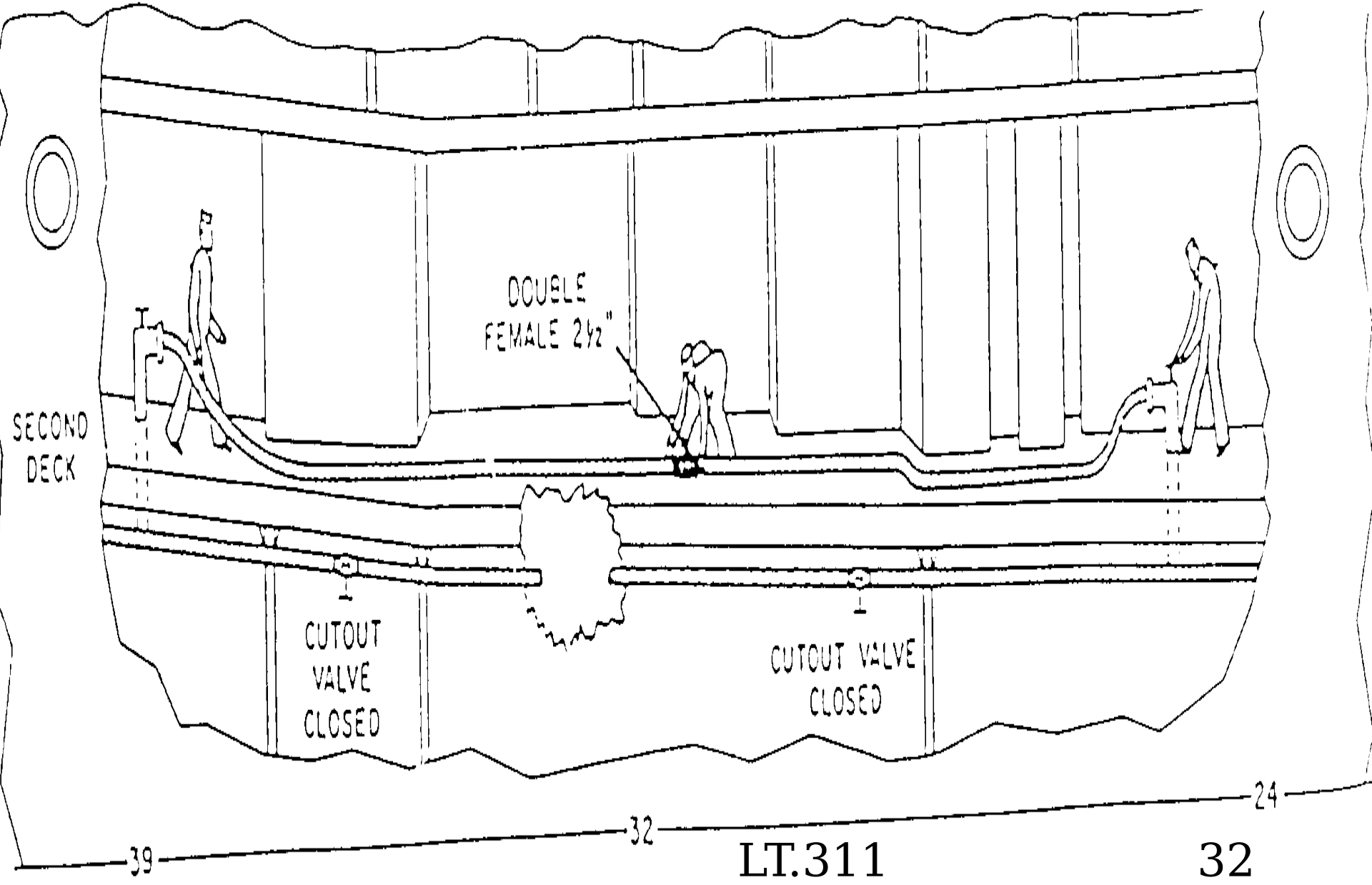
⇨May have to rig temporary jumper between fire hose stations or special jumper flanged connnections

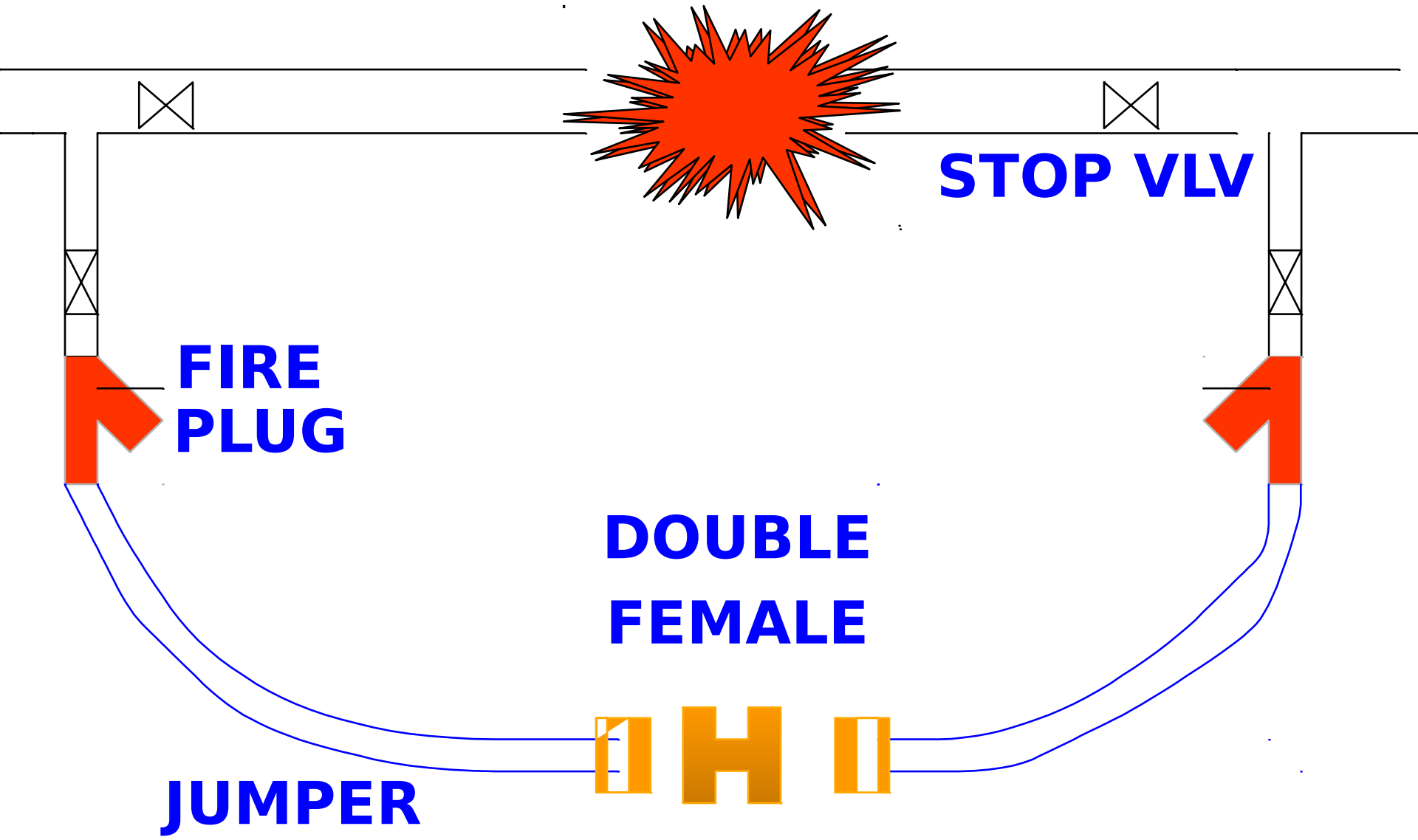
- Bypasses damaged section

PROCEDURES

- Secure isolation valves at either end of rupture
- Remove wye-gates from required fireplugs
- Attach 2-1/2 in. hose to each fireplug
- Connect 2 lengths of hose using a 2-1/2 inch double female coupling
- Open fireplugs

PROVIDING TEMPORARY FIREMAIN BY USING HOSE AND DOUBLE FEMALE COUPLING





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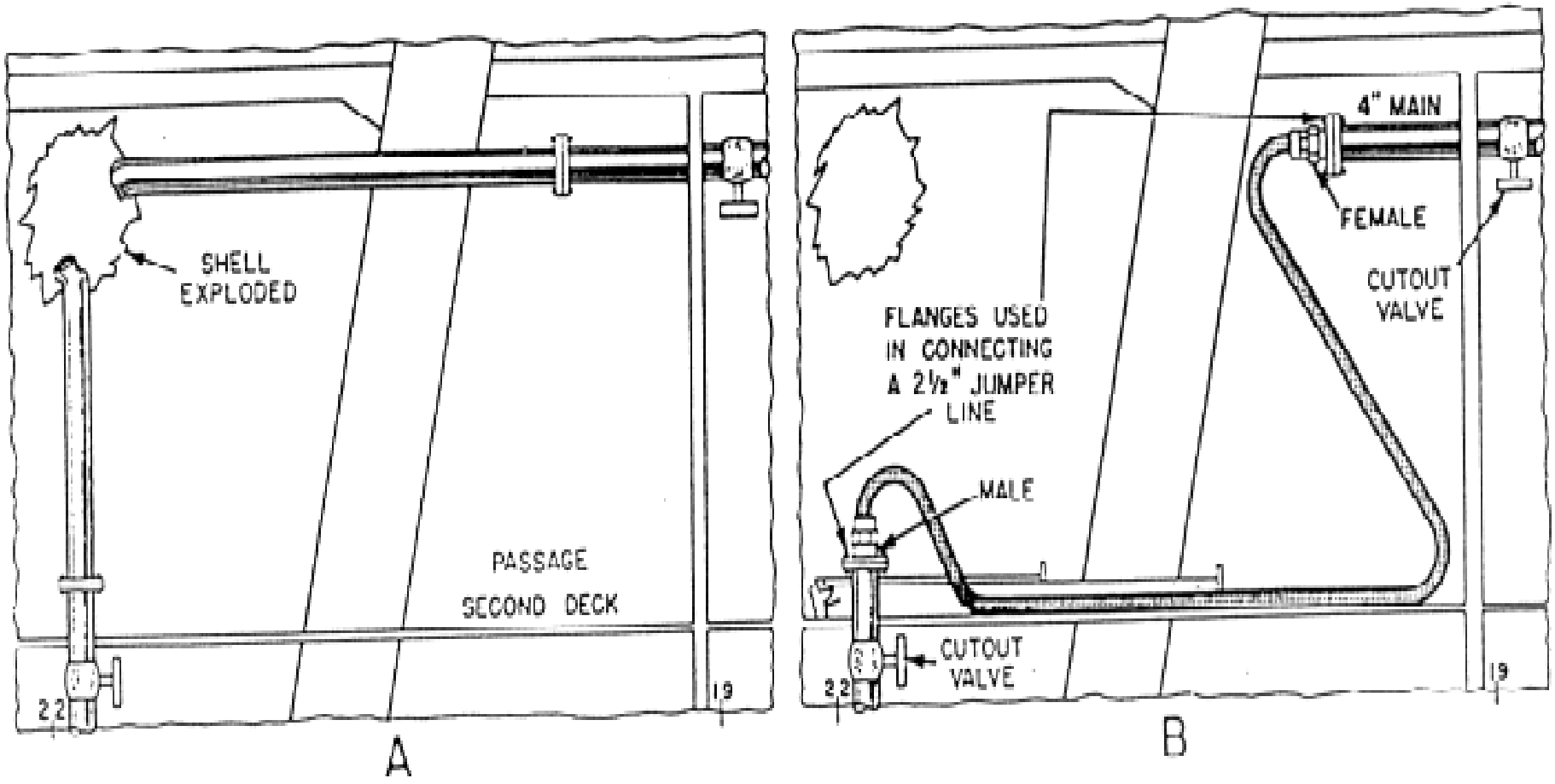
PROCEDURES - Rigging jumpers between firemain flanges

- Secure isolation valves nearest rupture
- Remove ruptured section of firemain at flanged joints
- Bolt on adapters at flanges
  - 1 male and 1 female
- Connect length of 2-1/2 inch hose
- Open isolation valves
- Use trigate



PROVIDING TEMPORARY FIREMAIN SERVICE BY USING FLANGES AND A FIRE HOSE

INSPECTION AREAS

- PIPING
- STRAINERS
- INSULATION
- REMOTE OPERATORS (MANUAL, ELECTRICAL, HYDRAULIC)
- VALVES
- LABELING
- HANGERS
- PUMPS
- CONTROLLERS
- GAUGES
- JOINTS (WELDED & MECHANICAL)

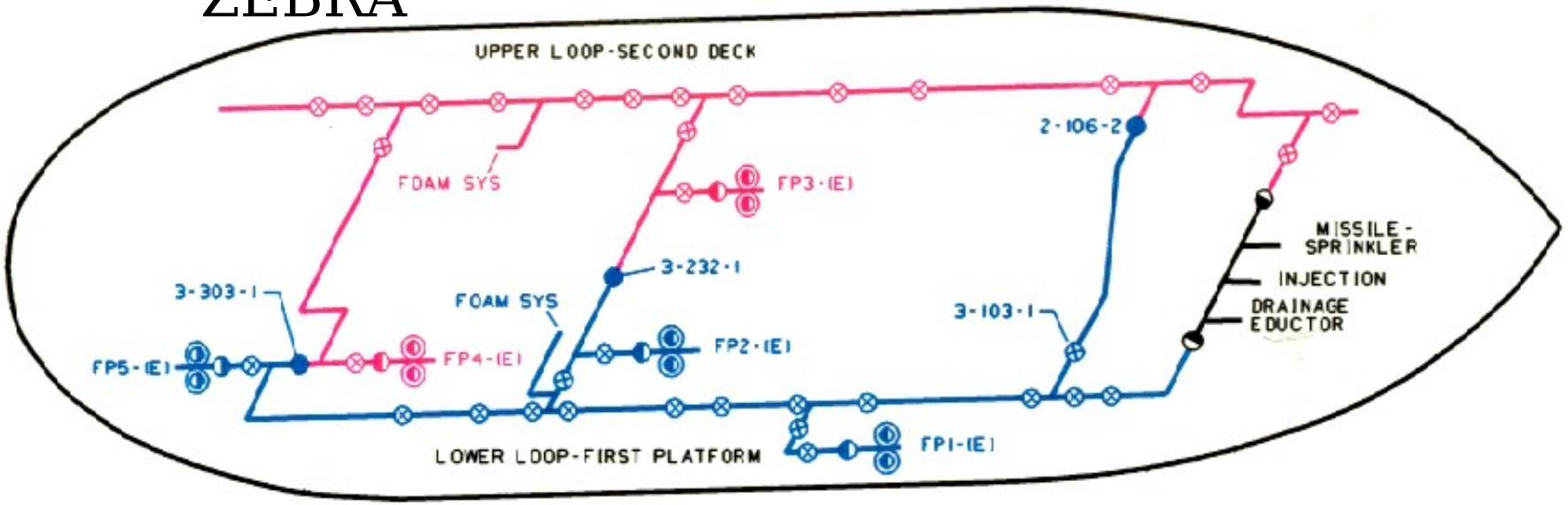
DC DIAGRAM

- FIREMAIN, SPRINKLER, FOAM & WASHDOWN SYSTEMS
  - Shows cutout valves
  - Location of all fireplugs
  - CMWD valves
  - Sprinkler groups
  - Foam system valves

DC BOOK
SECTION IIe

- Fire pumps
  - How many, what type, location
  - Start/stop locations
- Type of firemain
- Zebra valves
- Fire stations
- Magazine Sprinkler groups

FIREMAIN SEGREGATION - Condition ZEBRA



ALL PUMPS AVAILABLE FOR OPERATION OF THE MK13 GMLS, SPRINKLER SYSTEM, BOOSTER SUPPRESSION & DRAINAGE EDUCTORS

LOWER LOOP - FP1-(E), FP2-(E), & FP5-(E)

UPPER LOOP - FP3-(E), & FP4-(E)

THE FIREMAIN LOOP IS SEGREGATED INTO TWO SECTIONS. IN CONDITION "ZEBRA" AS INDICATED ABOVE. TO ESTABLISH CONDITION "ZEBRA" FROM CONDITION "X-RAY" OR "YOKE", THE FOLLOWING THREE "ZEBRA" VALVES ARE CLOSED.

VALVE NO.	LOCATION	REMOTE CONTROL
2-106-2	2-100-4-L	2-292-01-C
3-232-1	5-212-0-E	2-292-01-C
3-303-1	5-292-0-E	2-292-01-C

MOB-D-20-SF
ISOLATING & PATCHING DAMAGED PIPING

- Train repair parties to isolate a damaged section of the firemain or other piping & make emergency repairs
- Pipe patching kit
- Firemain chart available & used to identify all systems affected

LESSON 3.11 SUMMARY

- Design features
- Types of systems
- Parasitic systems
- Fire pumps
- Additional equipment
- Required maintenance
- Bimetallic corrosion

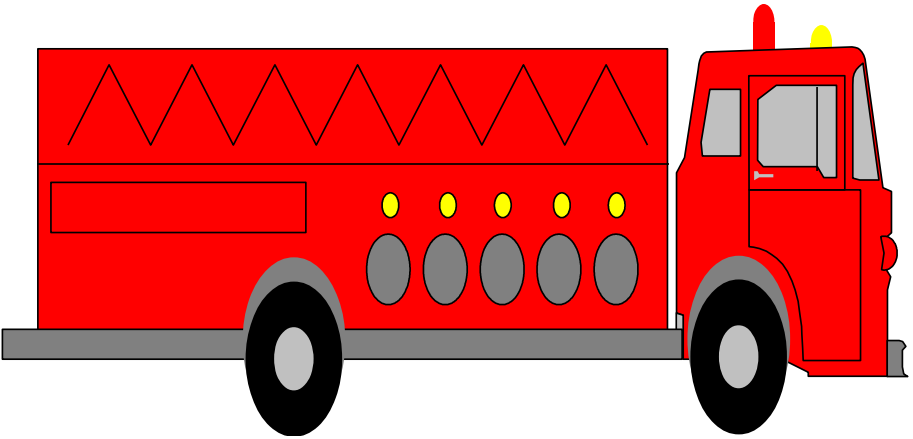
QUESTION #1

- WHAT ARE THE FOUR TYPES OF FIREMAIN SYSTEMS?

ANSWER

- SINGLE MAIN
- HORIZONTAL LOOP
- VERTICAL LOOP
- COMPOSITE

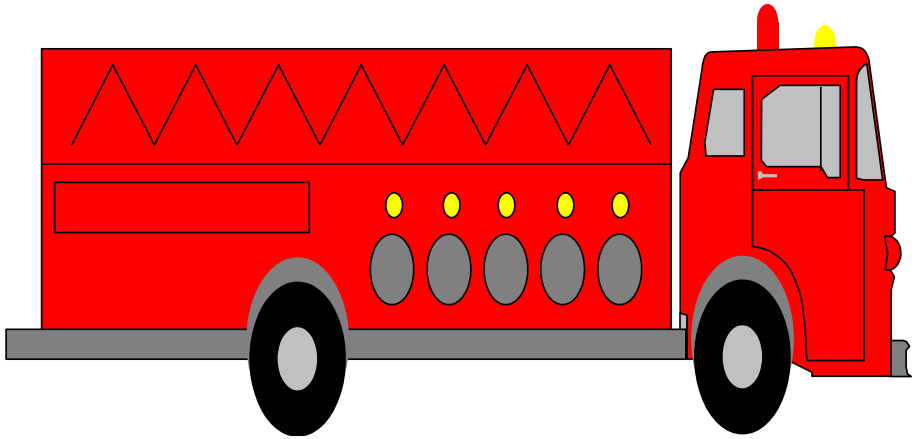
QUESTION #2

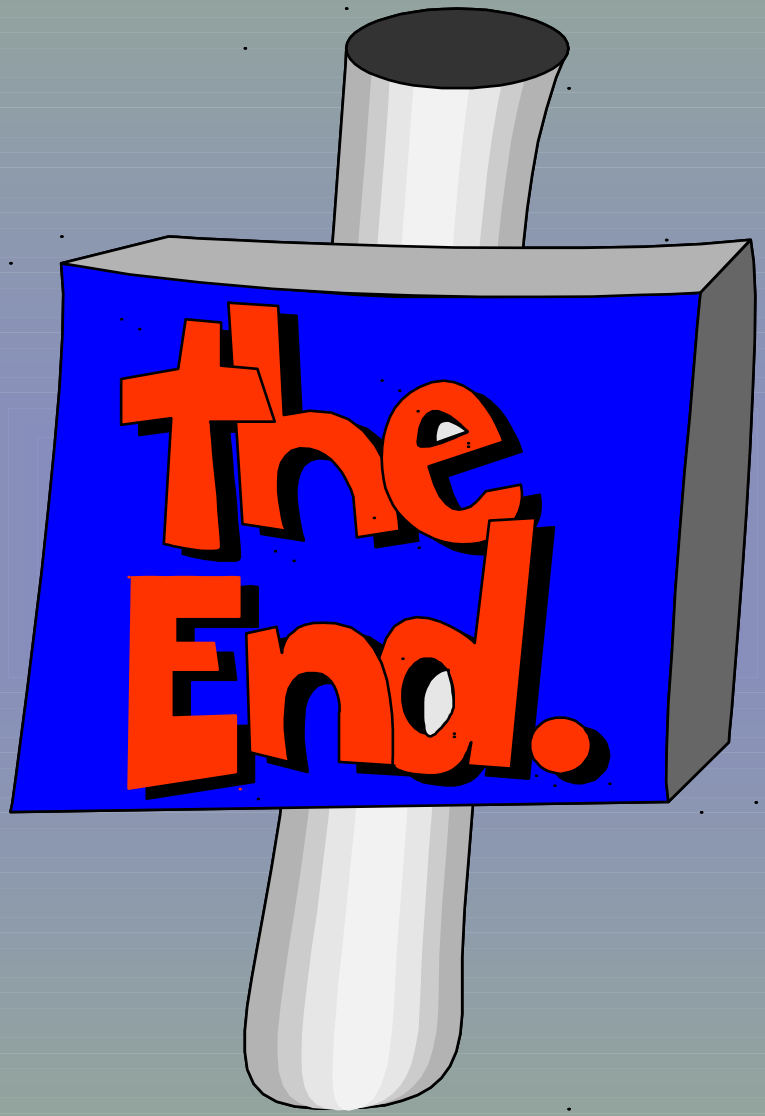


- NAME SOME OF THE SERVICES PROVIDED BY THE FIREMAIN SYSTEM.

ANSWER

- **CMWD**
- **FLUSHING**
- **MAGAZINE SPRINKLING**
- **BALLASTING**
- **EMERGENCY ELECTRONIC COOLING**
- **DECON STATION**
- **EDUCTOR OPERATION**

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